

Amendments to the Claims

This listing of claims will replace all prior versions and listing of claims in the application:

Listing of Claims:

Claim 1 (currently amended) An apparatus for adjusting a texture within an arbitrarily-shaped user-defined region of a surface of an arbitrarily-shaped three-dimensional virtual object, the apparatus comprising:

(a) a memory for storing a code defining a set of instructions; and

(b) a processor for executing the set of instructions,

wherein the code comprises a graphical user interface module adapted to provide a [A] three-dimensional graphical user interface element rendered in three-dimensional object space, the element comprising at least one active location for adjusting [[a]] the texture, wherein the texture is mapped onto [[an]] the arbitrarily-shaped user-defined region of [[a]] the surface of [[a]] the arbitrarily-shaped three-dimensional virtual object without using geometric projection, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region.

Claim 2 (currently amended) ~~The graphical user interface element apparatus~~ of claim 1, wherein the at least one active location for adjusting the texture comprises at least one member selected from the group consisting of:

(a) a first active location for translating the texture;

- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 3 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the at least one active location for adjusting the texture comprises at least two members selected from the group consisting of:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 4 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the at least one active location for adjusting the texture comprises:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 5 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the texture is an image.

Claim 6 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the texture comprises a tiled pattern.

Claim 7 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the texture is an embossing pattern.

Claim 8 (currently amended) The ~~graphical user interface element~~ apparatus of claim 7, wherein the at least one active location for adjusting the texture comprises an active location for adjusting an embossing height normal to the surface of the virtual object.

Claim 9 (currently amended) The ~~graphical user interface element~~ apparatus of claim 7, wherein the at least one active location for adjusting the texture comprises an active location for adjusting an embossing depth normal to the surface of the virtual object.

Claim 10 (currently amended) An apparatus for adjusting a texture within an arbitrarily-shaped user-defined region of a surface of an arbitrarily-shaped three-dimensional virtual object, the apparatus comprising:

(a) a memory for storing a code defining a set of instructions; and

(b) a processor for executing the set of instructions,

wherein the code comprises a haptic graphical user interface module adapted to provide a [[A]] three-dimensional haptic graphical user interface element rendered in three-dimensional object space, the element comprising at least one active location for adjusting [[a]] the texture, wherein the texture is mapped onto [[an]] the arbitrarily-shaped user-defined region of [[a]] the surface of [[a]] the arbitrarily-shaped three-dimensional virtual object without using geometric projection, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to

adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region, and wherein the at least one active location is associated with haptic feedback.

Claim 11 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 10, wherein the at least one active location comprises at least one member selected from the group consisting of:

- (a) a first active location for translating the texture;
- (b) a second active location for rotating the texture; and
- (c) a third active location for scaling the texture.

Claim 12 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 10, wherein the haptic feedback comprises a gravity well associated with an active location.

Claim 13 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 10, wherein the haptic feedback comprises a haptic constraint.

Claim 14 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to the surface of the virtual object.

Claim 15 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to the user-defined region.

Claim 16 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to an axis.

Claim 17 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 16, further comprising at least one haptic detent active on the axis.

Claim 18 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is adapted to constrain movement of a cursor to a loop.

Claim 19 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 18, further comprising at least one haptic detent active on the loop.

Claim 20 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for rotating the texture.

Claim 21 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for translating the texture.

Claim 22 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 13, wherein the haptic constraint is activated by a user signal performed when a cursor is located at an active location for scaling the texture.

Claim 23 (currently amended) A method for adjusting a texture within a user-defined region of a surface of a three-dimensional virtual object, the method comprising the steps of:

(a) ~~displaying rendering~~ a three-dimensional graphical user interface element in three-dimensional object space, the element comprising at least one active location for adjusting a two-dimensional texture within an arbitrarily-shaped user-defined region of a surface of ~~[[a]]~~ an arbitrarily-shaped three-dimensional virtual object, wherein the user-defined region is less than the entire surface of the three-dimensional virtual object, and wherein the three-dimensional graphical user interface element is operable to adjust the mapped texture within the arbitrarily shaped user-defined region of the surface without affecting a contiguous portion of said surface outside said user-defined region; and

(b) adjusting the texture according to a user manipulation via a graphical user interface device at the at least one active location,

wherein the adjusting of step (b) comprises modifying a transformation matrix used in mapping points on the surface of the virtual object to points on the texture without using geometric projection.

Claim 24 (original) The method of claim 23, further comprising the step of:

(c) graphically rendering the virtual object with the adjusted texture.

Claim 25 (original) The method of claim 24, wherein the graphical rendering of step (c) comprises providing a preview of the virtual object with the adjusted texture without changing a volumetric representation of the three-dimensional virtual object.

Claim 26 (original) The method of claim 25, wherein the volumetric representation is a voxel-based representation.

Claim 27 (original) The method of claim 25, further comprising the step of:

(d) modifying the volumetric representation of the three-dimensional virtual object upon an activation of a user signal.

Claim 28 (original) The method of claim 27, wherein the activation of the user signal comprises at least one of a button click and a button release.

Claim 29 (original) The method of claim 23, further comprising the steps of:

- (c) arming a haptic constraint; and
- (d) disarming the haptic constraint.

Claim 30 (canceled)

Claim 31 (currently amended) The apparatus of claim [[30]] 1, wherein the code further comprises a selection module adapted to select one of the at least one active locations of the

graphical user interface element based on a two-dimensional correspondence of the active location and a cursor.

Claim 32 (original) The apparatus of claim 31, wherein the code further comprises a repositioning module adapted to move the cursor to a three-dimensional position corresponding to one of the at least one active locations of the graphical user interface element.

Claim 33 (currently amended) The apparatus of claim [[30]] 1, wherein the graphical user interface element is a haptic graphical user interface element, and wherein the at least one active location is associated with haptic feedback.

Claim 34 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, the element graphically represented in three-dimensional object space with at least one of:

- (i) a position that relates to a position of the mapped texture;
- (ii) a scale that relates to a scale of the mapped texture; and
- (iii) an orientation that relates to an orientation of the mapped texture.

Claim 35 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, the element graphically represented in three-dimensional object space with at least two of:

- (i) a position that relates to a position of the mapped texture;
- (ii) a scale that relates to a scale of the mapped texture; and
- (iii) an orientation that relates to an orientation of the mapped texture.

Claim 36 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, the element graphically represented in three-dimensional object space with a position, scale, and orientation that relate to a position, scale, and orientation of the mapped texture.

Claim 37 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, the element comprising a plurality of active locations for adjusting the texture.

Claim 38 (currently amended) The ~~graphical user interface element~~ apparatus of claim 37, wherein at least two of the plurality of active locations perform different functions.

Claim 39 (currently amended) The ~~graphical user interface element~~ apparatus of claim 1, wherein the graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 40 (currently amended) The ~~haptic graphical user interface element~~ apparatus of claim 10, wherein the haptic graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 41 (previously presented) The method of claim 23, wherein the graphical user interface element comprises an X-axis, a Y-axis, and a Z-axis.

Claim 42 – 44 (canceled)

Claim 45 (currently amended) The ~~method~~ apparatus of claim 1, wherein the surface of the three-dimensional virtual object is non-planar, non-spherical, and non-cylindrical.

Claim 46 (currently amended) The apparatus of claim [[30]] 10, wherein the surface of the three-dimensional virtual object is non-planar, non-spherical, and non-cylindrical.

Claim 47 (currently amended) The ~~method~~ apparatus of claim 1, wherein a boundary of the texture is not constrained to align with a boundary of the arbitrarily-shaped, user-defined region.

Claim 48 (currently amended) The apparatus of claim [[30]] 10, wherein a boundary of the texture is not constrained to align with a boundary of the arbitrarily-shaped, user-defined region.